The Genera of North American Phalangiinæ.—In working over the rich collections of harvest-men belonging to the Illinois State Laboratory of Natural History, in connection with recent European literature, I find that very few of the species described by Wood,[1] under the old genus *Phalangium*, belong to that genus as now restricted by the best European authorities. I have before me specimens of eight of the species treated by Wood (my determinations of all but two of them having been verified, through the kindness of Mr. Charles W. Woodworth, by comparison with the types in the Museum of Comparative Zoology), and I find that *P. dorsatum*, *vittatum*, *nigropalpi*, and *verrucosum*, all belong to the genus *Liobunum* of C. Koch, as defined by Simon.[2] I have also provisionally referred *P. formosum* and *P. calcar* to this genus, though, on account of the projecting inner angle of the palpal patella in the former and the spur-like process on the outer ventro-lateral surface of the femur of the palpus in the latter, they do not appear to strictly belong to it. *P. cinereum* falls into the restricted genus *Phalangium*, and *P. pictum* goes to *Oligolophus*. I suspect that *P. bicolor* and *P. ventricosum* also belong to *Liobunum*.

In this connection, I desire to call the attention of collectors to a simple method by which the genital organs of the Phalangiinæ may be exposed for study,—a fact which aids considerably in their determination, as these organs, especially in the male, frequently have specific peculiarities. If the caudal portion of the abdomen be compressed between the thumb and finger, the genital organs will be pushed out of the genital opening between the coxæ, and, if the specimen be dropped immediately into alcohol, will generally remain exposed. This method of protruding the genital organs was first described by Latreille in 1796, but does not seem to have been known to many later writers. It is very much preferable to the method of dissection described by Wood. I incline to believe that by its use good distinguishing characters can be obtained from the ovipositor, which will aid in separating the females of certain species that closely resemble each other.—*Clarence M. Weed, Illinois State Lab. Nat. Hist., Champaign*, 18th August, 1887.

ZOOLOGY.

Key to the Recent Families of Sponges.—The following "key" is taken from Dr. R. von Lendenfeld's recent paper (*Proc. Zool. Soc. London*, 1886, pp. 558–662, 1887) on the "Systematic Position and Classification of Sponges":

0.	Skeleton calcareous	1
	No calcareous skeleton	6
1.	Entoderm consists exclusively of collar-cells	2
	Entoderm consists of collar- and pavement-cells	3

[1] Commun. Essex Inst., vol. vi. pp. 10–40. [2] Arach. de France, vol. vi. p. 172.

2.	Mesoderm thin, gastral cavity irregular	*Asconidæ.*
	Mesoderm thin, radial cylindrical chambers	*Homodermidæ.*
	Mesoderm thick, irregular chambers	*Leucopsidæ.*
3.	With cylindrical chambers	4
	With spherical chambers	5
4.	Chambers radial, opening directly into gastral cavity	*Syconidæ.*
	Chambers opening into exhalent canals which lead into the gastral cavity	*Sylleibidæ.*
5.	Exhalents lead into oscular tubes	*Leuconidæ.*
	Exhalents open direct on one side of the lamellar sponge; inhalent pores on the other side exclusively	*Teichonidæ.*
6.	With hexact spicules and thimble-shaped chambers	7
	Without hexact spicules; with spherical or sac-shaped chambers	16
7.	The spicules remain isolated or partly coalesce, afterwards irregularly	8
	The supporting spicules early coalesce in a regular dictyonid manner	12
8.	Hexaster in the interior	10
	No hexasters, but amphidiscs	11
9.	Hypodermalia hexact, sword-shaped, with centripetal radial ray the longest; no pinnulæ	*Euplectellidæ.*
	Pinnulæ in the gastral and dermal surfaces	*Asconematidæ.*
	Dermalia without centripetal ray; no pinnulæ	*Rossellidæ.*
10.	With numerous pinnulæ	*Hyalonematidæ.*
11.	With uncinates	13
	Without uncinates	15
12.	With radially situated clavulæ	*Farreidæ.*
	With radially situated scopulæ	14
13.	Branched and anastomosing tubes; the skeleton-net forming several layers	*Euretidæ.*
	Branching tubular or calyculate, honeycombed; cavities traversed by reticular membrane	*Melittionidæ.*
	Calyculate or expanded, traversed transversely by funnel-shaped canals opening alternately on one or other surface	*Coscinoporidæ.*
	Canals irregular, traversing the dense dictyonal skeleton obliquely or longitudinally	*Tetradictyidæ.*
14.	Meandrically winding tubes	*Meandrospongidæ.*
15.	With cartilaginous ground-substance and spherical chambers. Spicules polyact, tetract, lithistid, tylostylote, or stylote; never cemented with spongin. Askeletous forms with spherical chambers	17
	With soft ground-substance, spherical or sac-shaped chambers. Spicules monaxon, never tylostylote, cemented with spongin. Or skeleton composed of horny fibre without proper spicules. Askeletous forms with sac-shaped chambers	30
16.	With lithistid irregular tetraxon spicules	18
	With tetraxon spicules of irregular shape; askeletous forms with large chambers, which have large outlets	19
	With monaxon tylostylote spicules	27
	Without supporting spicules; flesh-spicules, when present, polyact; with small chambers which have narrow outlets	29
17.	Spicules quite irregular	*Rhizomorinidæ.*
	Spicules rod-shaped, with terminal tufts of branches	*Anomocladinidæ.*
	Spicules tetractin, with terminal branches	*Tetracladinidæ.*
18.	Spicules chiefly tetracts, with equal rays and candelabra	20
	Large tetract spicules, with three equal rays lying tangentially in or beyond the surface, and one differentiated radial ray	23
19.	With small inconspicuous ciliated chambers with small outlets	21
	With large conspicuous ciliated chambers with wide outlets	22
20.	With candelabra	*Corticidæ.*
	With simple tetracts	*Pachystrellidæ.*
21.	With scattered tetracts, triacts, diacts	*Plakinidæ.*
	Without spicules	*Oscarellidæ.*
22.	Tetracts with differentiated large centripetal ray and large tangential rays numerous	24
	Tetracts with differentiated large centripetal ray rare, with small tangential-rays	26

23.	With spherasters	*Geodidæ.*
	Without spherasters	25
24.	Flesh-spicules euaster and oxyaster	*Stellettidæ.*
	Flesh-spicules spirastrella	*Theneidæ.*
	Flesh-spicules spirula and sigmata	*Tetillidæ.*
25.	Without flesh-spicules	*Tethyopsyllidæ.*
26.	The widened distal ends of the radial spicule-bundles divide the regular subdermal cavities into ectochonæ or vestibules at the entrance of the inhalent canals	*Tethyidæ.*
	Between the distal ends of the radial spicule-bundles ecto- and entochonæ are found	*Sollasellidæ.*
	The inhalent pores lead direct into the inhalent canals	28
27.	With spirastrellid flesh-spicules	*Spirastrellidæ.*
	With sigmate flesh-spicules	*Suberamatidæ.*
	Without flesh spicules	*Suberitidæ.*
28.	With polyact flesh spicules	*Chondrillidæ.*
	Without flesh-spicules	*Chondrosidæ.*
29.	With proper spicules in the supporting skeleton	31
	Without proper spicules in the supporting skeleton	35
30.	With uniformly distributed skeleton reticulation and not very large subdermal cavities	32
	The skeleton consists of a dense axial reticulation and isolated fibres extending from this to the surface. Beneath these very extensive subdermal cavities are situated	34
31.	With gemmulæ; living in fresh water	*Spongillidæ.*
	Without gemmulæ	33
32.	Without flesh-spicules; fibres of the supporting skeleton not spined	*Homorhaphidæ.*
	Flesh-spicules sigmata or spiral, no chelæ	*Heterorhaphidæ.*
	Flesh-spicules chelæ; when absent fibres of supporting skeleton spined	*Desmacidonidæ.*
33.	No chelæ	*Axinellidæ.*
34.	With small spherical chambers and opaque ground-substance	36
	With large sac-shaped chambers and transparent ground-substance	39
35.	Without filaments in the ground-substance	37
	With filaments in the ground-substance	38
36.	Skeletal fibres with thin axial canal	*Spongidæ.*
	Skeletal fibres tubular, with thick pith	*Aplysinidæ.*
37.	Skeletal fibre with thin axial canal	*Hircinidæ.*
38.	Skeletal fibres with thin axial canal; reticulate	*Spongelidæ.*
	Skeletal fibres tubular, with thick pith; dendritic	*Aplysillidæ.*
	No skeleton	*Halisarcidæ.*

The reader is referred to this journal (September, 1887) for Dr. von Lendenfeld's grouping of the families embraced in the foregoing "key" into orders and larger groups. The following list will be found to embrace the most important technical terms introduced by the author or adopted from previous writers:

Astylote, without style-shaped spicules.

Amphidisc, a rod with an umbrella-shaped disk at each end.

Chelæ, anchor-shaped spicules.

Clavulæ, rods pointed at one end and bearing a knob or disk at the other.

Dermalia, dermal spicules.

Diactina, a member of the tetraxonia group of spicules, with three rays.

Dictyonid, the main hexact spicules coalesce, to begin with, in

a very regular manner so as to form a continuous skeleton, as in the suborder Dictyonina.

Euaster, a stellate spicule with stout pointed conic spicules radiating from one point. Occurs only in flesh-spicules.

Gemmulæ. The winter buds or statoblasts of fresh-water sponges.

Hexaster, a star-shaped spicule with six generally equal rays, belonging to the triaxonian group.

Hypodermalia. Dermalia with imbedded radial ray only.

Lithistid, as in the group Lithistida, which has the spicules tetraxon and often branched.

Monaxonia, with one straight or curved axis, rod-shaped, sometimes with lamellar outgrowths.

Oxyaster, a stellate spicule with long, slender pointed rays radiating from one point. Occurs only among flesh-spicules.

Pinnula, a triaxonian star with five or six rays, one of which is highly developed and branched or covered with disks or scales. The opposite ray is smooth or absent; the other four equal (tangential).

Polyact, without definite axes and with numerous rays.

Scopulæ, fork- or broom-shaped spicules consisting of a long shaft traversed by an axial rod, to the distal end of which some slender anaxial rods are attached.

Sigmata, S-shaped irregularly-curved flesh-spicules.

Spheraster, a ball of spicules radiating from a common centre.

Spirastrella, a spicule the numerous rays of which arise from a stout spiral base.

Spirula, a spiral spicule without spines.

Stylus, a rod-shaped spicule pointed at one end and rounded at the other, but not knobbed.

Tetraxona, with four axes radiating from one point. The ends of the spicules lie in the corners of a square pyramid and their derivatives.

Tetractina, a tetraxonian spicule with four rays.

Triaxonia, spicules with three axes and six rays and their derivatives.

Triactina, a tetraxonian spicule with three rays.

Uncinata, a rod with recurved hooks throughout its entire length.

Occurrence of Stizostedium vitreum in the Basin of the Connecticut.—In March, 1887, a small specimen of the above-named species was brought to the Museum of Wesleyan University, having been caught in Little River, a tributary of the Connecticut, in the town of Cromwell, Conn. The specimen was about eleven and one-half inches in length. The find appeared so extraordinary that the fact was communicated to Professor Goode, of Washington. Subsequently the specimen was

forwarded to him, and the identification of the species was confirmed by him. The remarkable interest of the find appears when it is considered that no species of Stizostedium is known in any of the rivers of the Atlantic coast between the St. Lawrence and the Susquehanna. The question has been raised whether the species could have been introduced accidentally in stocking the Connecticut with shad and salmon. This does not seem probable. I am informed by Hon. R. G. Pike, one of the Fish Commissioners of Connecticut, that all the eggs of shad used in stocking the Connecticut have been derived from localities within the Connecticut basin itself. Salmon have been introduced into the Connecticut from the St. Lawrence basin, but no such importation has taken place since 1879. As no instance is known of the capture of Stizostedium in the Connecticut during the intervening years, it is not likely that it was introduced with the salmon. It appears likely that the eggs were carried across from the waters of the St. Lawrence basin to those of the Connecticut basin by becoming attached to the feet of birds. Any one who will observe on the map how close together the tributaries of the two streams come, at a number of localities in Northern Vermont and Southern Canada, will recognize how easily the transfer might be accomplished. It is among the possibilities that a Stizostedium caught by some sportsman in a tributary of the St. Lawrence might have been thrown, still living, into a tributary of the Connecticut.—*William North Rice, Wesleyan University, Middletown, Conn.*

Birds Roosting in a Town.—For several weeks past the large maples and lindens of the centrally-situated court-house square in Media have been literally alive with the birds that come there to roost each night. Just before dusk a continual stream of blackbirds, robins, and English sparrows may be seen coming from every quarter, and all bound for this little grove in the most central portion of the town. By the time daylight fails many thousands (I speak advisedly) of individuals belonging to these different species have assembled, and the commotion among the leaves during the process of settling for the night is something wonderful. If one hits a tree with a stone there is a noise of wings amounting to a perfect roar. Nor is this coming in of birds from the surrounding country for a night's lodging any new phenomenon in Media. Last year a heavy rain one night drowned about one hundred and fifty of them, and the boys the next morning gathered them with much glee. But is this not a remarkable thing, that these birds should seek a roosting-place in the heart of a town, and nightly pass over and reject hundreds of acres of trees where there would appear to be much less probability of their being disturbed? I have heard no satisfactory explanation of the matter, although much has been said con-

cerning it by one and another. Can some of your bird-loving readers tell us the why and the wherefore? For, I doubt not, similar cases are not wanting, there being no new thing under the sun. I am, etc.,

MEDIA, PENN., September 7, 1887. T. C. PALMER.

The Relation of the Dorsal Commissures of the Brain to the Formation of the Encephalic Vesicles.[1]—There are a number of features which are so universally characteristic of the vertebrate brain at its earliest stage of embryonic development that we are justified in considering them as primitive characters of the brain of the vertebrate stem. These are: 1. The constriction of the neural tube into four vesicles, which represent the prosencephalon, the thalamencephalon, the mesencephalon, and metencephalon.[2] 2. The formation of minor folds (*neuromeres*[3]) at the sides of the metencephalon, corresponding to the roots of the *vagus* and other cranial nerves. 3. The three outgrowths from the thalamencephalon forming the paired and median eyes. 4. The diverticulum from the floor of the thalamencephalon forming the hypophysis. The meaning of the second and third of these developmental features is now understood, but, to my knowledge, no adequate explanation has yet been offered either for hypophysis or for the encephalic vesicles. For the latter I offer the following hypothesis: *that the constriction of the brain-roof which gives rise to the four vesicles is for the accommodation of three nerve-fibre tracts decussating dorsally, viz., the superior and posterior commissures and the cerebellum, which in their primitive condition have a serial homology.*

There is considerable anatomical evidence for this hypothesis. It has for some years been held (Pawlowsky) that the *posterior commissure* which traverses the constriction between the thalami and mesencephala is not a commissure in the strict sense of the word, but consists of fibres from the two great tegmental tracts crossing to the opposite side of the brain. Similarly the *superior commissure*, first described independently by Bellonci and myself, also consists of fibres crossing from the thalami to the opposite hemisphere just in front of the pineal stalk. This commissure is almost constantly developed in the Vertebrata, although it has been little noticed hitherto. Finally, the cerebellum, as I have observed in the Urodele Amphibia, in which it is in an extremely primitive condition, is also composed of decussating tracts, uniting the metencephalon (medulla) with the opposite lobe of the mesencephalon. Supporting the anatomical

[1] Abstract read before the New York meeting of the Amer. Assoc. Adv. of Science, 1887, by Dr. Henry F. Osborn.

[2] I do not reckon the epencephalon (cerebellum) as a distinct segment, but as the roof of the metencephalon.

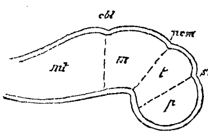
[3] This term has been applied by Dr. Henry Orr, of Princeton, in a paper soon to appear upon the development of the lizard's brain.

evidence is the fact that these three commissures develop nearly if not quite simultaneously, as may be seen in horizontal and vertical sections of the frog's brain, taken in closely succeeding stages. As shown in the accompanying figures, they occupy the three folds which separate the four segments, and appear simultaneously with the anterior commissure. It is noteworthy that the floor of the neural tube, which evidently has no relation with these dorsal commissures, is also the only region in which there are no folds between the vesicles, being interrupted only by the involution of the hypophysis. The inference to be drawn from these facts depends largely upon the question whether there is really a serial homology between the superior and posterior commissures in their primitive condition. If there is, this hypothesis yields some valuable data as to the primitive condition of the encephalon. If there is no such homology between these commissures, there yet remains considerable ground for the supposition that the inter-vesicular folds are simply lines of retarded growth in the walls and roof of the tube to be traversed at an early period by the commissures.—*Henry F. Osborn.*

EXPLANATION OF CUTS.

FIG. 1. Diagrammatic longitudinal section of the frog's brain at an early stage, showing the division of the neural tube into the prosencephalon, *p*; thalamencephalon, *t*; mesencephalon, *m*; and metencephalon, *mt*. The letters are placed in the respective ventricles.

FIG. 2. Camera drawing of a vertical section of the frog's brain at a later stage, showing the dorsal commissures occupying the inter-vesicular folds. *Scm*, superior commissure; *pcm*, posterior commissure; *cbl*, cerebellum; *hph*, infundibulum; *acm*, anterior commissure; *pn*, pineal gland.



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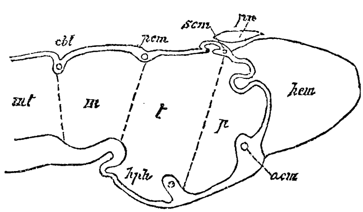

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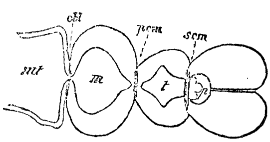

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FIG. 3. Camera drawing of a horizontal section of the frog's brain at the same stage, showing the commissures traversing the folds.

The Tongue of Humming-Birds.—In recent ornithological works the tongue of the humming-bird is usually described as a double tube, and is probably used in sucking the nectar of flowers. Recently Dr. Schufeldt has investigated the subject, and in *Forest and Stream* for July 14, 1887, gives the results of his studies. He shows that the account given by MacGillivray in

Audubon's "Birds of America" is correct. The hollow cylinders exist, but each horny tube is completely filled by the cartilaginous rod of the glosso-hyal element, and hence cannot be used in sucking. The tongue is, on the other hand, an instrument for the prehension of small insects. Dr. Schufeldt further states that in not a single cephalic structural particular do the humming-birds agree with the swifts.

On the Morphology of Ribs.[1]—Embryology has shown that the ribs are developed *between* the mesoblastic somits; they are therefore *intervertebral.*

The problem now is, how the different modifications of the position and structure of the ribs derived from that original condition.

If we carefully examine the skeleton of Amia, one of the living Ganoids of this continent, we observe the following: All the centra of the dorsal vertebræ consist of one piece, the posterior part of which shows on each side a process where the ribs are articulated. The same condition is to be seen in the first caudals. From the forty-fourth vertebra a change is beginning. This and the following vertebra consists of two parts,—an anterior disk and a posterior one. The anterior represents the centrum proper, the posterior the so-called intercentrum. Palæontology has shown that in some fishes allied to Amia *all* the vertebræ show the characters of the caudals of that form;[2] and I do not doubt that we will find in young specimens of Amia the dorsal vertebræ divided by a suture separating a vertebra in the anterior centrum proper and the posterior *intercentrum.* In all the dorsal vertebræ the rib is connected with a process of the posterior parts of the centrum,—that is, the *intercentrum.* In the posterior dorsals these processes become smaller, but the ribs are always connected with them. From the thirty-sixth vertebra the ribs unite below. The processes begin to disappear and the ribs are now articulated directly with the free intercentra.

The so-called untere Bogen, lower arches, or hæmapophyses of Amia, *are therefore really the ribs.*

In the first caudal vertebræ we find free spines connected with the distal part of the united ribs; these are co-ossified to those from the forty-seventh vertebra.

As the ribs or pleural arches are homonomous to the neurapophyses, or pleural arches, these spines which may be called *pleural spines* are homonomous to the neural spines; both are supporting the unpaired fins.

The same condition is to be seen in *Lepidosteus*, *Ceratodus*, and *Lepidosiren*,—perhaps in all Ganoidei and Dipnoi.

[1] A paper read before the American Association for the Advancement of Science, August, 1887.

[2] According to a verbal communication of Professor Zittel.

From that fact Gegenbaur reached the general conclusion that the ribs of all vertebrates are nothing else than the modifications of the lower arches, the hæmapophyses; or, reversed, that the hæmapophyses are ribs.

Now, anybody who examines a young skeleton of Alligator or Necturus will find that in the caudal vertebræ *ribs are present besides the lower arches*, hæmapophyses, or chevrons.

That the processes of the caudal vertebræ, which are free in young animals, are true *ribs* can easily be proved on a skeleton of a young Sphenodon.

There are no lumbar vertebræ in Sphenodon, all the presacral vertebræ have well-developed ribs, but the posterior ones are uniting later with the vertebræ. The two sacral vertebræ and the anterior caudals show exactly the same condition; in the young animals the elements are free, but unite later with the vertebræ.

In the caudals we find, besides these ribs, well-developed hæmapophyses, or intercentra. The nature of these chevrons has been examined by Professor Cope and myself: they proved to be nothing else than processes of the intercentra united below; the same processes as those in Amia on which the ribs articulated.

Therefore the lower arches, which enclose the subcaudal blood-vessels, are either formed by true ribs or by processes of the intercentra.

Gegenbaur was wrong in relation to the Stapedifera. Claus was right in that, but did not give any explanation of the condition in fishes.

I shall try to explain all the difficulties.

There is no doubt that the original condition is to be seen in a form like Amia of the Ganoids.

Gegenbaur has shown that in many Teleostei the lower arches are not formed by the ribs, as in Amia, but by processes of the vertebræ, to which the ribs can be articulated. This condition can be seen in the given figures.

Exactly the same must have taken place in the higher Vertebrata. The processes of the intercentra became larger, until they united below, the ribs were pushed out of place and dislocated, not only to the centrum proper but also to the neural arch.

We have on hand all transitions between the caudal vertebræ of a form like Amia and the Teleostei. But the forms connecting the Dipnoans with the same structure of the caudal vertebræ as Amia and the lowest Batrachia, in which the lower arches are formed by the intercentra, as in all other Stapedifera, are still missing.

The Ribs of the Batrachia and Amniota.—In *Archegosaurus* the ribs of the dorsal region are not connected with the well-developed intercentra, but with diapophyses of the neural arches. In the cervical region the articular surface for the rib is continued

downwards, forming a groove on the posterior part of the side of the intercentrum. Therefore the single-headed ribs of Archegosaurus articulate in the anterior region of the vertebræ with both the intercentrum and neurapophysis, in the posterior region with the neurapophysis only.

In the living Batrachia the double-headed ribs are articulated to double-headed diapophyses of the neurapophysis.

Therefore in the Batrachians the ribs have been translocated from the original position on the intercentrum to the neurapophyses.

Whether the Batrachian centrum represents the centrum proper or the intercentrum, as Professor Cope is inclined to believe, cannot yet be determined. *Sphenosaurus* certainly is not a connecting form, but a true reptile, as I have proved.

The Ribs of the Amniota.—Signs of the original condition of the ribs, as seen in Amia, are still preserved in the Permian, Pelycosauria, the Sphenodontidæ, and the Mammalia.

In the Pelycosauria the ribs are connected with the well-developed intercentra; there would be no difference from Amia, if the ribs were not two-headed. A second head is developed, the tuberculum, touching the centrum of the vertebræ. The tuberculum is certainly a secondary development of the rib, going hand in hand with the rudimentation of the intercentrum, giving a better connection to the rib. The rib-articulation in *Sphenodon* is the same as in the Pelycosauria, but the tubercular articulation is more developed, the capitulum in a rudimentary form being transformed to ligament.

The same type we find in the Mammalia, as mentioned by Professor Cope, where the capitular articulation is between two vertebræ in an excavated fossa. The intercentrum has become rudimentary or disappeared entirely.

The one-headed ribs of the Lacertilia, Pythonomorpha, Ophidia, have originated from the condition seen in Sphenodon. The capitulum has gone entirely.

The two-headed ribs of the Ichthyosauria, Crocodilia, Dinosauria, Ornithosauria, have developed from a form like Sphenodon, in which the capitulum was still ossified, but was already transported from the rudimentary intercentrum to the centrum proper. This translocation has gone still further, in a way that both capitulum and tuberculum are at least situated on the neurapophysis.

All stages of this gradual wandering of the ribs can be observed in the vertebral column of a crocodile.

The first vertebra has a single-headed rib, connected with the intercentrum, as in Amia. The posterior dorsal have the two-headed ribs connected with well-developed dia-parapophyses of the neural arch. Between the condition found in the atlas and that in the posterior dorsals all stages can be seen in the intermediate vertebræ.

The results of the present paper are:

1. The ribs are developed *between* the myocomata; they are, therefore, *intervertebral.*

2. The ribs are originally one-headed and connected with well-developed intercentra.

3. All forms and connections of the other ribs can be derived from that condition.

4. The lower arches of the caudal vertebræ are either formed by true ribs, the oldest fishes (Ganoidei, Dipnoi), or by processes of the intercentra (Teleostei, Stapedifera).

5. The connection between the Dipnoans and the Stapedifera is still missing.

6. Some remarks on the nomenclature of the elements of the vertebral column.

Owen's names, "neurapophysis" and "pleurapophysis," are not correct; the neural and pleural arches are no processes of the vertebræ, but are distinct parts.

The two elements composing the neural arch ought to be called the "*neuroids;*" the two elements composing the pleural arch, the "*pleuroids.*"

The spines connected with the neuroids ought to be called, as before, *neural spines;* those connected with the pleuroids, *pleural spines.*

The real centrum of the vertebra ought to be called *centrum;* the lateral elements composing it, *hemicentra* (Albrecht), not pleurocentra.

The name intercentrum ought to be preserved.

The part of the intercentrum, centrum, or neuroid to which the capitulum is articulated, may retain the name *parapophysis;* the part of the centrum or neuroid to which the tuberculum is articulated, may retain the name *diapophysis.*—*Dr. G. Baur, New Haven, Conn.*, 1887.

Zoological News.—Lower Invertebrates.—Dr. A. C. Stokes describes some more new species of North American Hypotrichous Infusoria in the *Annals and Magazine of Natural History.*

Crustacea.—At a recent meeting of the Linnean Society of New South Wales, Mr. John Mitchell called attention to the fact that some of the Australian species of trilobites of the genus Acidaspis differ from the diagnosis of the genus in having the eyes faceted (not smooth) and the facial suture discontinuous.

Dr. W. Lilljeborg, of Upsala, has worked up the Entomostraca collected by Dr. Leonard Stejneger in his late expedition to the Commander Islands. The results appear in the *Proceedings of the United States National Museum.* Only two new species, *Eurycercus glacialis* and *Diaptomus ambiguus*, are described. *Calanus cristatus* Kröyer is reported as exceedingly abundant, their dead bodies forming long windrows on the beaches.

MYRIAPODS.—Mr. Chas. H. Bollman has recently published several papers on North American Myriapods. One, entitled "Notes on the North American Lithobidæ," appears in the *Annals of the New York Academy of Sciences*. In it he describes as new *Lithobus minnesotæ*, *tuber*, *proridens*, *pullus*, *trilobus*, *cardinalis*, *howei*, *politus* (McNiell MS.), and *clavus* (McNiell MS.). This is followed by a synonymical list of the known species of North American Lithobidæ and Scutigeridæ. A second paper—"Notes on North American Julidæ"—appears in the *Annals of the New York Academy* (vol. iv.). The author catalogues ninety-two species of the family known from North America, including the following new species: *Julus oweni*, *Spirobolus pensacolus*, *S. hebes*, *Parajulus ellipticus*, *P. castaneus*, *P. obtectus*, *P. varius*, and *Nanolene* (nov. gen.) *burkei*.

FISHES.—Jordan and Eigenmann, in an account of a collection of fishes from Charleston, S. C. (*Proc. Nat. Mus.*, 1887), enumerate fourteen species, nine of which were not previously known from that locality.

In a paper on the fishes of Kansas, Prof. O. P. Hay describes as new *Notropis æneolus* and *N. germanus*, and suggests that the genus Tirodon Hay was founded on a specimen of *Hybognathus nuchalis* with abnormal dentition.

C. Eigenmann and Jennie E. Hornung contribute to the *Annals of the New York Academy* a revision of the North American species of Chætodontidæ. They recognize fourteen species distributed in the genera Prognathodis, Chætodon, and Pomacanthus.

BIRDS.—The large collection of humming-birds made by Mr. D. G. Elliot and which formed the basis of his recent monograph has passed into possession of the American Museum in New York City. The museum has also acquired his ornithological library of about one thousand volumes.

Dr. Leonard Stejneger is publishing in the *Proceedings of the National Museum* an exhaustive review of the birds of Japan. In the same journal Mr. Robert Ridgway has recently described a new sub-species of plumed partridge (*Callipepla elegans bensoni*) from Sonora. His material consisted of five specimens.

EMBRYOLOGY.[1]

Spermatogenesis in Mammalia.[2]—The interest which attaches to the development of the spermatozoon, from the stand-point of the embryologist, is not less than that which attaches to the

[1] Edited by JOHN A. RYDER, Ph D., Biological Department, University of Pennsylvania, Philadelphia.

[2] Untersuchungen über den Bau des functionirenden Samenkanälchens einiger Säugethiere und Folgerungen für die Spermatogenese dieser Wirbeltheirklasse. Arch. f. Mik. Anat., xxx., 1887, pp. 49–110. Taf. v.–vii. Von Dr. Carl Benda, Berlin.